ATTRIBUTE BASED COMMUNICATION

INVENTOR

NANDAN S. RAJAN, BANGALORE, INDIA

BACKGROUND

1. FIELD OF THE INVENTION

[0001] The present invention relates generally to personal communications and more particularly to attribute based communications over existing networks.

2. DESCRIPTION OF THE RELATED ART

[0002] Consider two strangers across the street from each other with working cell phones. These people can potentially talk to people at the other end of the world, as long as the required network connections are in place (e.g., GSM phones with international dialing). However, they will not be able to talk to each other if they do not know the other person's cell phone number. They may well be able to talk to each other just by calling out to each other in the most primitive form of communication, but under our current social norms, strangers do not typically engage in this conduct.

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[0003] The more common approach is to use their cell phones. However, current telephone systems require that people wishing to talk to another person know the phone number of the other person.

[0004] In some situations, people are able to identify who they wish to communicate with based on some attribute possessed by a person carrying a telephone but we do not know their phone number. For example:

- We may wish to alert the people in the car ahead. We can identify the person we wish to speak to as the occupant of the car ahead (identified by its vehicle number). The "vehicle number" is the attribute of the person we use for identification.

- We may want to talk to the person sitting in front of us in a restaurant.

  The person can be identified based on the table she is sitting in. If tables in the restaurant are given some identification, then this table identity can be used as an attribute for identification.

- We may wish to speak to the person across the street but we only know their geographic location (e.g., relative location can be an attribute to identify that person).

- We may be able to identify the person based on her global positioning system ("GPS") coordinates. (By specifying a rectangular area in GPS coordinates within which she is located).

- We may wish to speak to a person of a certain occupation. Let's say we wish to speak to real estate agents. In this case we are not identifying a specific person

but any one person whose occupation is "real estate agent" (attribute -

occupation).

[0005] In all these cases we have identified whom we wish to speak with based on attributes of

the person possessing the telephone, but we are unable to make the conversation because we do

not know the telephone number of the other person.

[0006] Current communication systems use Intelligent Network architectures such as Signaling

System 7 ("SS7") to provide capabilities such as 800 numbers. Further, Short Message Services

("SMS") are common in most mobile networks. SMS provides capability to send short data

message from one cell phone to another. Other similar messaging systems can also be use, such

as, multimedia messaging system ("MMS"), or the like.

[0007] Below, we draw attention to aspects of current communication systems to show that

components we use in the new system are variations of existing components and hence are

implementation using conventional components.

[0008] The aspects we are interested are and their usage in our system is discussed below:

[0009] 1. Ability to initiate a phone call to some virtual phone number, which is not the number

to which the call is connected. Communication networks using SS7 is capable of providing

capabilities like 800 numbers--where the number dialed itself is virtual and is mapped to some

real phone number dynamically when the call is made. We use such virtual phone numbers to

initiate attribute calls. The appropriate destination phone number is found dynamically and the

call is completed.

[0010] 2. Ability to receive messages and process them. Mobile networks provide capabilities like SMS. One implementation of SMS is for messages to be sent to a designated number on the network. A component called the Short Message Service Center ("SMSC") accepts messages destined for this number and then ensures delivery to the intended recipient. (There are differences in implementation of SMS between different systems, but the aspect that we are interested in is not affected by these differences.) We use capability to send data messages to a designated number, quite like SMS--the only difference in this case is that messages are stored in a database accessible to the Signal Connection Point ("SCP"). Also, while SMS requires the message to be routed further to the destination, in our system it is not routed any further.

[0011] 3. Ability to make an alphanumeric call. In current systems, when a mobile subscriber dials a destination phone number, a call packet is sent to the mobile switching center so that a connection can be set up with the destination phone number.

[0012] Therefore, it is desired to provide a method and system that enables communication between persons based on one or more of a set of desired attributes without requiring the specific knowledge of a telephone number associated with the person.

SUMMARY OF THE INVENTION

[0013] In accordance with one illustrative embodiment of the present invention, there is provided a system that allows communications to occur on the basis of attributes rather than phone numbers.

[0014] Attributes of people are one of the main drivers of communication. Currently, the requirement to know phone numbers restricts communication. By eliminating the need to know

phone numbers an important barrier to communication is removed. Further, the same person can be reached on the basis of multiple attributes -thus providing multiple points on which a person can be reached. Attributes can be registered/removed at the discretion of a person. This provides the ability to be reached on a temporary basis. This is advantageous when talking to strangers - divulging a phone number in such situations can lead to potential loss of privacy. (Listing on marketing lists, etc). The phone number is a permanent identity for communication and temporary identities are helpful in making initial conversation till the need for revealing a permanent identity arises. For example, if you are placing an advertisement for some reason and you need to provide a number for people to call you back you could set up an attribute and ask people to use that to contact you. The attribute can be removed after a designated period (say 2 weeks) -thereby protecting you from having to reveal your phone number.

[0015] In one embodiment, a system is provided for people to register any attributes on which they can be contacted and their phone number in a database. (e.g. occupation, vehicle number, or the like). A user wishing to communicate with someone with a particular attribute, or set of attributes, initiates a call request to a designated system phone number. The user specifies the attributes of the intended call recipient. The system processes the call request by receiving the attribute information and searching the database to find a phone number associated with a matching attribute or set of attributes. Then, a telephone communication link is established between the initial caller and the person having the caller's requested characteristics.

[0016] The features and advantages described in the specification are not all inclusive and, in particular, many additional features and advantages will be apparent to one of ordinary skill in the art in view of the drawings, specification, and claims. Moreover, it should be noted that the language used in the specification has been principally selected for readability and instructional

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purposes, and may not have been selected to delineate or circumscribe the inventive subject matter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] Figure 1 is a system element and communication flow diagram for an attribute call system according to one embodiment of the present invention.

[0018] Figure 2 is a system element and communication flow diagram for a Bridge attribute call system according to one embodiment of the present invention.

[0019] Figure 3 is a hierarchical Venn diagram of sets of phones relating to a communication group attribute call system according to one embodiment of the present invention.

[0020] Figure 4 is a system element and communication flow diagram for a real-time group networking attribute based communication system according to one embodiment of the present invention.

[0021] Figure 5 is a system element and communication flow diagram for a visual identification based group networking attribute call system according to one embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0022] The Figures and the following description relate to preferred embodiments of the present invention by way of illustration only. It should be noted that from the following discussion, alternative embodiments of the structures and methods disclosed herein will be readily

recognized as viable alternatives that may be employed without departing from the principles of the claimed invention.

[0023] Unlike current systems where a sequence of digits is "dialed" to make a call, in our system a sequence of attributes is "dialed." This is just alphanumeric information that is substituted instead of the digits. It should be noticed that with respect to the present description, the terms "phone numbers" are used without differentiating between numbers used by phone subscribers and numbers used by the communications network in identifying subscribers or routing call requests. This is mainly to facilitate easy explanation.

[0024] The details of connectivity between the switching components, hardware-software split, and implementation details of these components are conventional in nature and are within the realm of knowledge of those skilled in the art. Similarly, communication between cell-phone, base station, and mobile switching center takes place in a conventional manner according to any of the existing communication protocols (e.g., Global System for Mobile Communications ("GSM"), Digital Cellular System ("DCS"), Integrated Services Digital Network ("ISDN"), Plain Old Telephone System ("POTS"), or the like). It should be noted that other wireless communications networks could be used to implement a system according to an embodiment of the present invention. Such wireless communications networks operate according to a protocols or standards associated with wireless communications technologies, such as for example, GSM, DCS, Personal Communication Service ("PCS"), Personal Digital Cellular ("PCD"), Global Packet Radio Systems ("GPRS"), Bluetooth, Infrared Data Association ("IrDA"), or the like.

[0025] In addition, for ease of description, some terms are described below as they are used with respect to the embodiments described herein. To the extent that these definitions are narrower

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than the common use of the terms, they are applicable only with respect to these embodiments and are not intended to limit the scope of the claims.

[0026] Communication system: all equipment used in establishing a communication link between the communicating parties. This includes broadly the communication devices and communication network; Virtual phone number: a phone number that does not represent any phone, it is just a number that will be used by the communications system to determine the actual phone number that is to be called (e.g. 800 numbers); Attribute: some information about a person. In the communication system, it is represented by a name that identifies the type of information and an associated value that is specific to the individual person (e.g., For someone whose profession is teaching, the "Occupation" attribute has the value teacher. Here the type of information is the nature of work a person does. This is identified by "Occupation" and for this particular person the value is "teacher"); Registration information: attributes and associated phone number; Resolution: usually used to denote the operation of determining a phone number based on a set of specified attributes (e.g., attribute resolution); Name-value pairs: this consists of a name specifying a particular type of information followed by a specific value for that type of information (e.g., Occupation=teacher where occupation is the name and "teacher" is the value.)

[0027] In the embodiments described herein, mobile phones or cell phones are suitably modified to perform functions such as sending and receiving the messages defined later. Current mobile phones have the capability to send and receive SMS messages and hence modification to use a new message format is an extension of current capabilities. Further, the network components are conventional and their operation as it relates to passing messages through the network components according to the present invention is similar to the current SMS messaging operations.

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[0028] The principles used in building systems according to the several embodiments of the present invention can be used for fixed telephones as well as with different mobile telephone systems (GSM, CDMA, and the like). Further, although the explanation uses people as the end parties in a call, the system works any entity that is an end party in a telephone connection. Although the explanations below show voice calls being made, similar SMS based messaging systems as well as Internet Protocol based communication devices can use the same principles-- there are many communication channels that can use attribute calls. The current system can be easily adapted to these other channels.

ILLUSTRATIVE EMBODIMENT USING MOBILE PHONES

[0029] These concepts are embodied in a sample embodiment explained below. According to this embodiment, two mobile phone users are exemplary users for description of the system operation.

[0030] Now referring to Figure 1, one embodiment of a mobile phone system 100 is shown. User Vinod 102a is able to make an attribute call to user John 102b. User Vinod 102a is a representative user having a mobile phone. In this scenario Vinod 102a wishes to communicate with a paramedic. (i.e., he is identifying the person he wishes to communicate based on "occupation" attribute of the person). Similarly, User John 102b possesses a mobile phone and is a qualified paramedic. He is willing to have people contact him in case they need a paramedic. Any number of attributes can be used according to this embodiment. For example, users of this embodiment are able to send and receive calls based on a user's electronic mail address ("email-id"). This is accomplished by registering a user's email-id as an attribute with the system.

[0031] The telecom network switch 104 is a "Signal Switching Point (SSP)" as defined in SS7 terminology. For simplicity in this scenario this switch services the phones of Vinod 102a and John 102b. However, as it is known in the art, different switches may service different users while still performing the same basic communication operation.

[0032] Registration Center 106 ("RC") is similar to the Short Messaging Service center ("SMSC") used, for example, in Short Message Service of GSM networks. Registration Center 106 answers to a designated phone number on the mobile network, accepts registration messages and stores registration information in a database. The database 108 used by RC 106 is the same as used by Signal Connection Point 110 (SCP).

[0033] Signal Connection Point (SCP) pair 110 is a conventional SCP pair as defined with respect to SS7 systems. The SCP pair 110 includes databases 108 that provide information for advanced call processing. In this case, the SCP pair 110 and the RC 106 share the same databases 108. Hence the registration information is available for querying.

[0034] The Signal Transfer Point ("STP") pair 112 is also a conventional STP pair as defined with respect to SS7 systems. The STP pair 112 receives and routes incoming signaling messages towards the proper destination.

[0035] According to this embodiment of the present invention, a modified message layout is used for communications between the network components. The general layout of a message includes a protocol identifier field, ("ProtocolId"), a message identifier field ("MessageId"), a length of data field (i.e., Length of remaining data), and the Message data. The Length of remaining data field includes a value for the length of the data following this field in the

message, for example in kilo bytes ("Kb"). The Message data includes the actual data

corresponding to the message (i.e., the payload).

[0036] According to this embodiment, two message types are provided. In general, message

data is provided in Name-value pairs. For example, a list of name-value pairs is specified by

using a ';' as the delimiter of list of elements.

[0037] The first message type is the "Attribute_register" message. The Attribute_register

message is sent to Registration Center 106 by a user 102 wishing to register attributes. After

registration, this user 102 can be contacted by other users 102on the basis of those attributes.

Table 1a shows the general lay out of a message data field for an Attribute_register message.

Table 1b is one example of an Attribute_register message according to this embodiment.

ATTRIBUTE	REGISTER	DATA_LENGTH
REGISTERED_PHONE_NUMBER=VALUE;SEMICOLON SEPARATED LIST OF ATTRIBUTES		

Table 1a

ATTRIBUTE	REGISTER	Computed length of remaining data
REGISTERED_PHONE_NUMBER=7334564444;OCCUPATION=PARAMEDIC;		

Table 1b

[0038] The second message type is the "Attribute_resolve" message. The Attribute resolve

message is sent to a designated virtual phone number associated with the system 100 by a user

102a who wants to call another user 102b possessing a specific attribute value. Table 2a shows

the general lay out of a message data field for an Attribute_ resolve message. Table 2b is one

example of an Attribute_ resolve message according to this embodiment.

ATTRIBUTE	REGISTER	DATA_LENGTH
ATTRIBUTE_NAME=VALUE;		

Table 2a

ATTRIBUTE	REGISTER	Computed length of remaining data
OCCUPATION=PARAMEDIC;		

Table 2b

[0039] The messages can be handled by the RC 106 and STP pair 112 to store and retrieve attributes and phone numbers according to the present embodiment. The attributes and phone numbers are stored in database 108, which maintains the attribute – phone number correlation information. Database 108 stores this information in an attribute table. The SCP Pair 110 and the RC 106 share this same database 108. The attribute information is stored according to the layout shown in table 3a. One example table entry is shown in Table 3b.

ATTRIBUTE_NAME	VALUE	REGISTERED_PHONE_NUMBER

Table 3a

ATTRIBUTE_NAME	VALUE	REGISTERED_PHONE_NUMBER
OCCUPATION	PARAMEDIC	7334564444

Table 3b

SYSTEM OPERATION

[0040] For description purposes, a set of sample phone numbers are used to describe the operation of the system according to one embodiment of the present invention. As a general matter, the area code "600" used in connection with this description is intended to represent a conventional virtual number prefix, e.g., 800, 877, or the like. Elements of the system 100 are associated with phone numbers as follows:

Registration phone number: 600-555-7777
Attribute call number: 600-111-2222

[0041] User John's phone number: 733-456-4444

[0042] Table 4 describes one embodiment of system 100 as shown in Fig. 1.

Step	Description	Example
121	Attribute registration: A registration message (Attribute_register) containing attributes and phone number is sent to a designated registration phone number	John wants people to reach him based on his occupation. So he creates a "Attribute_register" message (similar to a SMS message) and sends it to the registration number 600-555-7777 This message specifies John's occupation attribute, phone number. (REGISTERED_ PHONE_NUMBER=7334564444; OCCUPATION=paramedic;).
122	The call is routed through the switch 104 to the registration phone number	John's call is routed through the switch to the registration phone number
123	Registration center 106 stores details in database 108.	John's attribute information and phone number are stored. In Attribute table: ATTRIBUTE_NAME=OCCUPATION, VALUE=paramedic, REGISTERED_PHONE_NUMBER=7334564444
124	Attribute call Caller 102a sends a data packet specifying attributes and desired values to a designated virtual phone number	Vinod is on the highway and needs a paramedic to assist him. He makes an attribute call to 600-111-2222 specifying the attribute he is looking for (OCCUPATION=paramedic).
125	The switch 104 realizes it cannot complete the call and sends a query to STP 112	Switch S realizes it cannot complete a 600 series number and so sends a query to STP with attribute information specified in the call and the virtual phone number (600-111-2222).
126	STP 112 sends the query to SCP 110	
127	SCP 110 uses the passed information to query stored records and retrieves associated phone number is then passed back in a response to STP 112	SCP uses the passed attribute information to look for a record that matches. It retrieves John's phone number since his attribute matches the one specified in the query. In terms of the database the query is looking for records matching the following criteria: (ATTRIBUTE_NAME=OCCUPATION, VALUE=paramedic) It returns John's phone number to STP.

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128	STP 112 sends response back to switch 104	
129	Switch 104 now completes call with phone of user 102b	Switch knows John's phone number is handled by it and so completes the connection with John's phone.

Table 4

ILLUSTRATIVE EMBODIMENT OF BRIDGED CALL SYSTEM

[0043] Disclosing a phone number can result in a loss of privacy. There are situations where both parties do not want to reveal their phone number -for example during a one-off trade. There may be no need for further communication if the trade does not go through.

[0044] According to one embodiment, this is can be accomplished by creating a "bridge" between the users. Now referring to Fig. 2, one embodiment of a Bridge Call System 200 is shown. A bridge is an entity that creates a communication link between phones. The communication network provider maintains the bridge. A database with a bridge identifier along with associated phone numbers is maintained. Whenever a call is made to a designated virtual phone number and the bridge identifier is specified a connection is established between the phone numbers associated with the bridge. The network provider hides the phone numbers of one participant from the other. The people involved in the call need to just know about the bridge identifier.

[0045] According to this embodiment, several message types are provided. In general, message data is provided in Name-value pairs. For example, a list of name-value pairs is specified by using a ';' as the delimiter of list of elements.

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[0046] The first message type is the "Bridge_Create" message. The Bridge_Create message is sent to Registration Center 106 by a user 102 wishing to maintain a phone number anonymity in the system 200. The Bridge_Create message includes three fields, a user phone number field ("OWNER_PHONE_NUMBER") to identify the phone number that is to remain anonymous, a user defined name to identify the bridge ("BRIDGE_NHAME"), and an optional password ("PASSWORD") so that only the user can make changes and access the phone number information. Table 5a shows the general lay out of a message data field for a Bridge_Create message.

[0047] Similarly, Tables 5b-5d show the fields for other message types according to this embodiment: Bridge_add for connecting another user's phone ("OTHER_PHONE_NUMBER") to an existing bridge, Bridge_connect for establishing a call, and Brige_delete to remove the other user's phone number from the associated bridge related to a particular user.

BRIDGE	CREATE	DATA_LENGTH
OWNER_PHONE_NUMBER=VALUE; BRIDGE_NAME=VALUE;PASSWORD=VALUE;		

Table 5a

BRIDGE	ADD	DATA_LENGTH
OTHER_PHONE_NUMBER=VALUE; BRIDGE_NAME=VALUE;PASSWORD=VALUE;		

Table 5b

BRIDGE	ADD	DATA_LENGTH
BRIDGE_NAME=VALUE;PASSWORD=VALUE		

Table 5c

BRIDGE	DELETE	DATA_LENGTH
OTHER_PHONE_NUMBER=VALUE; BRIDGE_NAME=VALUE;PASSWORD=VALUE;		

Table 5d

[0048] The messages can be handled by the RC 106 and STP pair 112 to set-up a bridge and store and retrieve phone numbers associated with a bridge according to the present embodiment. The bridge information and phone numbers are stored in database 108, which maintains the attribute – phone number correlation information. Database 108 stores this information in a

bridge table. The SCP Pair 110 and the RC 106 share this same database 108. The bridge

information is stored according to the layout shown in table 6.

BRIDGE_NAME	PASSWORD	OWNER_PHONE_NUMBER	OTHER_PHONE_NUMBER

Table 6

SYSTEM OPERATION

[0049] For description purposes, a set of sample phone numbers are used to describe the

operation of the system according to one embodiment of the present invention. As a general

matter, the area code "600" used in connection with this description is intended to represent a

conventional virtual number prefix, e.g., 800, 877, or the like. Elements of the system 100 are

associated with phone numbers as follows:

Bridge connection phone number	600-565-6556
Registration center phone number	600-444-6666
Jane's phone number	733-555-4444
Janet's phone number	733-444-5555

[0050] Table 7 describes one embodiment of system 200 as shown in Fig. 2. For illustration

purposes, corresponding examples to each of the steps relate to a sample transaction. In this

example, Jane and Janet are users negotiating the sale of a cupboard. As they do not know each

other they prefer to use a Bridge for this one-off communication.

Step	Description	Example
211	Bridge creation: Someone 102a who wants a bridge created sends a Bridge_Create message.	Jane sends a Bridge_Create message to the registration center. The parameters are: OWNER_PHONE_NUMBER=7335554444; BRIDGE_NAME=sofa_sale; PASSWORD=4567;
212	Switch 104 routes call to Registration Center 106	
213	Bridge is created: Bridge name, password, owner phone number is stored in database 108	At the registration center the information is stored in the database.
214	Bridge information is passed on to other person 102b	Jane sends Janet an email with Bridge information. (Name and password)

215	Other person 102b sends a Bridge_add message	Janet sends a Bridge_add message to the registration center with her phone number, bridge name and password. The parameters are: OTHER_PHONE_NUMBER=7334445555; BRIDGE_NAME=cupboard _sale; PASSWORD=4567;
216	Switch 104 routes call to registration center 106	
217	Bridge name and password is validated at the Registration center 106 and the other person's phone number is recorded	At the registration center the bridge name and password is validated and then Janet's phone number is updated in the database.
218	Any of the two persons now sends a "Bridge_Connect" message to a designated virtual phone number.	Janet sends a "Bridge_Connect" message to the bridge connection phone number.
219	The switch 104 realizes it cannot complete the call and sends a query to STP 112.	Switch S realizes it cannot complete a 600 series number and so sends a query to STP with bridge information and caller phone number.
220	STP 112 sends the query to SCP 110.	
221	SCP 110 uses the passed information to query stored records. Since the caller phone number is known, it determines the other phone number associated with the bridge and this phone number is returned back to STP 112.	SCP uses bridge name and password to retrieve correct record. It then uses caller phone number to identify the other phone number to which call should be completed. Since Janet made the call it returns Jane's phone number to STP.
222	STP 112 sends response back to switch 104.	
223	Switch 104 completes call with the other user 102	Switch realizes Jane's phone number is serviced by it and hence completes the call.

Table 7

ILLUSTRATIVE EMBODIMENT OF REAL-TIME NETWORKING

[0051] As we go through our daily routine we come across hundreds of people around us: in supermarkets, restaurants, traffic intersections, theatres, etc. If we knew more about them, we may realize they possess attributes that may be of use to us and hence we may wish to communicate with them. Suppose we wish to speak with someone possessing a certain attribute.

(Let's say real estate agents) We may be interested in speaking to someone who is in our vicinity at this very moment so that we can potentially meet conveniently at short notice. This would avoid us having to go out of our way to meet them. As we look for real-estate agents--perhaps they are sitting at the restaurant next door. If we could know they were real estate agents and if we could discretely talk to them with our phone, we could evaluate and then potentially meet with minimal inconvenience since they are close to us. Additionally we may want to talk to people around us just because of some attribute they possess--perhaps they like gardening and you could potentially find common ground later.

[0052] Accordingly, one embodiment of the present invention provides a system of communication where cell phone users who do not know each others phone numbers can join an electronic communication group, identify people in the group who possess a desired attribute and then interact with the other person without any loss of privacy such as disclosure of phone number. The communication channel can be established on a one-off basis with no after effects such as the nuisance of the other person continuing to contact you despite your disinclination to continue to communicate. For example customers at a shopping mall can join an electronic communication group, discover people with some attribute that they find useful and then interact. In a sense, the system greatly enhances your chances of 'bumping into' someone who you could find useful in some way.

A HYPOTHETICAL EXAMPLE

[0053] A hypothetical restaurant decides to facilitate its customers to discover attributes about each other, interact and potentially benefit from the interaction. The management of the restaurant decides to manage an electronic communication group ("restaurant group"). They

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specify a group administration policy that restricts registration and resolution of attributes in its group to only customers present in the restaurant.

[0054] Customers to the restaurant are potentially strangers to each other. They may possess attributes that may be of potential benefit to others. By registering their attributes in the restaurant group they are providing an opportunity for other customers to discover their skills and potentially utilize them. The un-coordinated presence to two strangers in the same restaurant could potentially turn beneficial for them when they discover some desired attribute that the other person possess. In the absence of this system, this opportunity would have been lost due to the lack of a mechanism to discover such attributes.

[0055] The benefit of this system is that when you search based on attributes within the restaurant group you are assured that the person you are talking to is around nearby (in the restaurant) and you can easily meet up. (The group administrator maintains the information in the group to some degree of accuracy). Further, you may be able to draw some inferences about the person based on the image of the restaurant. (e.g. If this is an up market restaurant you may think it more likely that the person is reasonably successful.)

[0056] Now let's go back to our original problem of locating real estate agents who are "nearby". Let's say we are right now in a restaurant located in a shopping mall. Let's say we have different groups--one for users anywhere in the city, the second for people in the shopping mall and the third for people in the restaurant. Then we can search for people with the attribute desired by us in any of these groups, based on our discretion. We may look in our nearest group- the restaurant we are in, before trying the shopping mall and then potentially the city group.

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[0057] As can be seen in Fig. 3, the shopping mall group 301 can potentially have more phones registered with it than the restaurant group 302. However the people in the city group 303 are spread across the city and it may be inconvenient to meet them. Thus, when trying to locate someone with a specific attribute various groups can be attempted based on the caller's discretion.

ILLUSTRATIVE EMBODIMENT OF REAL-TIME NETWORKING IN A GROUP

[0058] The working of such a system is explained with reference to Fig. 1. As described with respect to Fig.1, all attribute information was stored in a database 108 without any grouping. However, according to this embodiment, by associating a group identifier with the attribute information groups can be implemented. This is explained in more detail below.

[0059] For example, a virtual phone number is assigned to denote the group representing the restaurant. This phone number is used as the group identifier that will uniquely identify all information pertaining to the group. The restaurant management is made to identify one phone number that will act as the group administration phone number. These phone numbers are recorded in a database 108. Only the group administration phone number will be allowed to send registration messages for the group. As customers come in, registration messages are sent on behalf of the customer to the designated registration number from the group administration phone number. The registration information is stored along with the group identification information--thereby tying the registration information to the group. When customers need to make attribute calls within the group, they send an attribute resolve message--but as opposed to the system virtual number, this time a user dials the virtual phone number designated for the group. The call is routed to the SCP 110. According to this embodiment, the SCP 110 searches

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for suitable attributes belonging to the specified group (identified by the group identifier in the database 108) and thus resolves the call only within registration made in the group.

[0060] One example of a common situation that can be greatly improved with a group system according to this embodiment is an airline flight. In general, airlines recognize that flights, particularly long flights, can be boring. In order to attract and maintain customers, airlines provide several entertainment systems, e.g., in-flight movies, audio channels, and the like. Another in-flight entertainment may include an attribute based communication system that can be used by passengers to communicate with each other. For example, a number of topic groups can be created on board based on attributes registered by different passengers. Passengers can then communicate based on their interests, when they wish to and without any loss of privacy.

[0061] According to the group feature of the present invention, groups can generally include two types based on registration type, that is, controlled or unrestricted registration.

[0062] Controlled registration without disclosure of phone number to administrator

[0063] One aspect of the system that can be a powerful driver for communication between strangers is the ability to communicate without having to disclose any information (e.g. phone numbers) that can be a source of nuisance later. The group system described above necessitates disclosure of phone numbers to group administrators. This can potentially be an inhibiter in using the system. Group administrators need to have capability to control attribute registration/deletion to the group. However, people may not be comfortable providing their telephone numbers to administrators. To solve this problem a 'port' mechanism is used. A port is a name-password pair that provides permission for registering and resolving attributes within a group. Group administrators create ports and pass on this information to potential members.

These members then use port information to register and resolve attributes. According to this embodiment, registration and resolution messages are validated for port information and hence only those with valid port information can participate in the group.

[0064] As can be seen from the above description, the usage of the port mechanism allows administrators to control information in the group without knowing about the phone numbers of the people involved.

[0065] There are many ways to implement these concepts. In one embodiment groups are implemented as a service of the communication network provider. That is to say that the communication network providers provide a 'site grouping' service. The service provides the capability to create groups and manage them. The actual management of the group is left to whomever avails of this service (i.e. the customer). Thus the group information is maintained in databases of the network provider with management control resting with whoever is running the group. Customers who would be interested in managing a group would be management of restaurants, theatres, shopping malls, and the like.

[0066] In general, a group enabled system according to this embodiment includes the following procedures:

[0067] (1) Group creation: When a customer requests for a group to be created, a suitable software application is used to reserve a virtual phone number to represent the group. This number is called the group phone number ("GROUP_PHONE_NUMBER"). The customer is made to designate someone as a group administrator and that person's phone number is designated the group administrator number. The group phone number and group administrator phone number are recorded in a database of the network provider.

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[0068] (2) Port creation: The group administrator sends a message to a registration center (as before), specifying port creation information. The message is validated to be from the group administrator and the port name, password and group identifier is recorded in a database.

[0069] (3) Group Membership: The group administrator provides the port information to anyone she permits to join the group. This can happen in any manner -on a written piece of paper, orally, or the like. Anyone who has valid port information is a member of the group.

[0070] (4) Attribute registration: The new group member sends an attribute registration message to the registration center. The message also contains the group identification so that the destination group is known. At the message center, a suitable application uses the information in the message to validate that the port name and password is valid for the group. The attribute information is then stored in the database.

[0071] (5) Attribute resolution: A group member creates an attribute resolution message and sends it to the group phone number. This message has the port name, password along with the attribute information. Since the group phone number is a virtual phone number, the call is routed to the SCP. At the SCP the port information is validated and the group information in the database is queried for a matching attribute.

[0072] (6) Call Set-up: When a record with matching attribute is found, the call is completed with the associated phone number.

[0073] (7) Port Reuse: When the group administrator deems that a persons membership has expired, the administrator sends a "port free" message to the registration center. On receipt of

this message membership is deleted for the person using the port. This is accomplished by deleting registration information of the person.

[0074] Now referring to Fig. 4, a sample controlled registration group enabled embodiment of a system 400 is shown. For illustration purposes, the system is described with respect to a sample transaction wherein a user 102a "Anita" makes a call to another user 102b "Tom."

[0075] The system 400 includes communication network elements described with respect to Fig. 1. Same reference numerals are provided for similar elements and for their description see above. Additionally, system 400 includes a group administrator 402, depicted as "James."

[0076] According to this embodiment, several message types are provided. In general, message data is provided in Name-value pairs. For example, a list of name-value pairs is specified by using a ';' as the delimiter of list of elements.

[0077] The first message type is the "Port_Create" message. The Port_Create message is sent to Registration Center 106 by a group administrator to create a group port. A group member can then use the port to register and resolve attributes. The Port_Create message includes three fields, a user phone number field ("GROUP_NAME") to identify the entity that controls the registration, a group administrator defined name to identify the port ("PORT_NAME"), and an optional password ("PASSWORD") so that only the administrator can make access and registration available for the group, and a group phone number registration ("ADMIN_PHONE_NUMBER") to provide the associated number. Table 8a shows the general lay out of a message data field for a Port_Create message. Table 8b shows one example of a Port_Create message according to this embodiment.

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[0078] Similarly, Tables 8c/8d, 8e/8f, and 8g/8h, show the fields for other message types and corresponding examples according to this embodiment. Tables 8c/8d show the Port_Attribute_register message, which is sent by a group member who wishes to register attributes. The port name and password are provided to the new member by the administrator through some means (orally, written, etc.). Tables 8e/8f show the Group_Attribute_resolve message, which is sent by a group member who wishes to make a phone call based on an attribute. As above, the port name and password are provided to the member by the administrator through some means (orally, written, etc.). Similarly, Tables 8g/8h show the Port_empty message, which is sent by a group administrator to free up a port. The password for the port is changed so that the port may be re-used later by some other new member. For example, this can happen when the administrator provides port name and password to the new member.

PORT	CREATE	DATA_LENGTH
GROUP_NAME=VALUE; PORT_NAME=VALUE; PASSWORD=VALUE; ADMIN_PHONE_NUMBER=VALUE;		

Table 8a

PORT	CREATE	Computed length of remaining data
GROUP_NAME=ShortEats; PORT_NAME=temp; PASSWORD=2345; ADMIN_PHONE_NUMBER=6132226789;		

Table 8b

PORT	ATTRIBUTE_REGISTER	DATA_LENGTH
GROUP_NAME=VALUE; PORT_NAME=VALUE; PASSWORD=VALUE; MEMBER_PHONE_NUMBER=VALUE; [Semicolon separated list of attribute/values pairs]		

Table 8c

PORT	ATTRIBUTE_REGISTER	Computed length of remaining data
GROUP_NAME=ShortEats;PORT_NAME=temp; PASSWORD=2345; OCCUPATION=real estate agent; HOBBIES =skiing;		

Table 8d

PORT	ATTRIBUTE_RESOLVE	DATA_LENGTH
GROUP_NAME=VALUE;PORT_NAME=VALUE;PASSWORD=VALUE; ATTRIBUTE;		

Table 8e

PORT	ATTRIBUTE_RESOLVE	Computed length of remaining data
GROUP_NAME=ShortEats;PORT_NAME=temp1;PASSWORD=1122;OCCUPATION=real estate agent;		

Table 8f

PORT	EMPTY	Computed length of remaining data
GROUP_NAME=VALUE;PORT_NAME=VALUE;PASSWORD=VALUE; NEW_PASSWORD=VALUE; ADMIN_PHONE_NUMBER=VALUE;		

Table 8g

PORT	EMPTY	Computed length of remaining data
GROUP_NAME=ShortEats;PORT_NAME=temp;PASSWORD=2345; NEW_PASSWORD=1122;ADMIN_PHONE_NUMBER=6132226789		

Table 8h

[0079] The messages can be handled by the RC 106 and STP pair 112 to set-up a group and store and retrieve group related information according to the present embodiment. The group information is also stored in database 108, which maintains the attribute – phone number correlation information. Database 108 stores this information in a set of group tables, including a Group_definition table, a Group_ports table, and a Port_attribute table which is equivalent to the attribute table for non-group embodiments. The SCP Pair 110 and the RC 106 share this same database 108. The group information is stored according to the layout shown in tables 9a-9f.

[0080] Table 9a shows the layout for the Group_definition table, which includes the GROUP_NAME field, the GROUP_PHONE_NUMBER field (the virtual number associated with the service for a particular entity), and the GROUP_ADMIN_PHONE_NUMBER field. Table 9b shows one example of a Group_definition table entry:

[0081] Similarly, Tables 9c/9d and 9e/9f show the fields for other database tables and their corresponding sample entries according to this embodiment. Tables 9c/9d show the Group_ports table, which stores port information. The information in the PORT_CREATE message is used to populate this table. Similarly, Tables 9e/9f show the Ports_attributes table, which stores the

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group member user information sent when a group member user sends a

PORT_ATTRIBUTE_REGISTRATION message.

GROUP_NAME	GROUP_PHONE_NUMBER	GROUP_ADMIN_PHONE_NUMBER

Table 9a

GROUP_NAME	GROUP_PHONE_NUMBER	GROUP_ADMIN_PHONE_NUMBER
ShortEats	600666777	6132226789

Table 9b

GROUP_PHONE_NUMBER	PORT_NAME	PASSWORD

Table 9c

GROUP_PHONE_NUMBER	PORT_NAME	PASSWORD
6006667777	Temp	2345

Table 9d

GROUP_PHONE_NUMBER	PORT_NAME	MEMBER_PHONE_NUMBER	ATTRIBUTE_NAME	VALUE

Table 9e

GROUP_PHONE_NUMBER	PORT_NAME	MEMBER_PHONE_NUMBER	ATTRIBUTE_NAME	VALUE
6006667777	Temp	7454565463	OCCUPATION	Real estate agent
6006667777	Temp	7454565463	HOBBIES	skiing

Table 9f

SYSTEM OPERATION

[0082] For description purposes, a set of sample phone numbers are used to describe the

operation of the system according to one embodiment of the present invention. As a general

matter, the area code "600" used in connection with this description is intended to represent a

conventional virtual number prefix, e.g., 800, 877, or the like. Elements of the system 400 are

associated with phone numbers as follows:

Group Name	ShortEats
Group administrator phone number	613-222-6789
Group phone number	600-666-7777
Registration center number	600-444-6666
Tom's phone number	745-456-5463

[0083] Table 10 describes one embodiment of system 400 as shown in Fig. 4. For illustration

purposes, corresponding examples to each of the steps relate to a sample transaction. In this

example, a hypothetical restaurant "ShortEats" decides to avail of the "spot grouping" service.

The management of the restaurant identifies James to be the group administrator.

Step	Description	Example
411	Group creation: A group is created by assigning a virtual phone number to represent the group and designating a phone number as the group administrator 402 phone number. This information is provided to the Registration center 106.	A group called "ShortEats" is created with James being selected as the group administrator. The following information is provided to the Registration center: Group name: ShortEats Group administrator phone number: 6132226789 Group phone number: 6006667777
412	Group creation information is stored in a database 108. The database 108 is accessible to the SCP 110.	Registration center stores the information in the group_definition table.
413	Port creation: Group administrator sends "port creation" message to the registration phone number.	James sends a Port_create message to the registration phone number (600-444-6666). The message parameters are: GROUP_NAME=ShortEats PORT_NAME=temp PASSWORD=2345 ADMIN_PHONE_NUMBER=6132226789;
414	Switch 104 routes call to Registration center 106.	
415	Registration center 106 validates call is from group administrator and then stores port information in database 108.	At the registration center the call originator is validated using the ADMIN_PHONE_NUMBER parameter and port name and password are recorded in the database. The Group_ports table is populated as follows: GROUP_PHONE_NUMBER=6006667777, PORT_NAME=temp, PASSWORD=2345
416	Port information is provided to new member 102b. (By some means not defined by this	Tom walks into the restaurant and is provided with port name and password. .

	system--e.g. orally)	.
417	Member 102b registers attributes through port.	Tom registers his profession attribute in the group by sending a Port_Attribute_register message to the registration phone number. (600-444-6666) The message parameters are: GROUP_NAME=ShortEats; PORT_NAME=temp; PASSWORD=2345; MEMBER_PHONE_NUMBER=7454565463 OCCUPATION=real estate agent HOBBIES=skiing
418	Switch 104 routes call to Registration center 106.	
419	Registration center 106 stores details in a database 108.	At the registration center the group, port, password is validated and then Tom's attributes are recorded in the SCP database. (The Port_attributes table is populated with attribute and phone number information.)
420	Port creation for caller 102a: Group administrator sends "port_create" message to the registration phone number.	Anita enters the restaurant. Since the restaurant provides all customers an opportunity to communicate using their group, James needs to create a port for her. James sends a Port_create message to the registration phone number (600-444-6666). The message parameters are: GROUP_NAME=ShortEats; PORT_NAME=temp1; PASSWORD=1122 ADMIN_PHONE_NUMBER=6132226789;
421	Switch 104 routes call to Registration center 106.	
422	Registration center 106 stores details in a database 108.	At the registration center the call originator is validated using the ADMIN_PHONE_NUMBER parameter and port name and password are recorded in the database. The Group_ports table is populated as follows: GROUP_PHONE_NUMBER=6006667777, PORT_NAME=temp1, PASSWORD=1122
423	Port information is provided to new member 102a.	Anita is provided a port name and password.

424	Attribute call Caller 102a sends a Group_attribute_resolve message specifying attributes and desired values to a designated and virtual phone number.	She decides to try and locate a real estate agent in the restaurant. She sends a Group_attribute_resolve message to the group phone number (6006667777). The message parameters are: GROUP_NAME=ShortEats; PORT_NAME=temp1; PASSWORD=1122; OCCUPATION=real estate agent;
425	The switch 104 realizes it cannot complete the call and sends a query to STP 112.	Switch S realizes it cannot complete a 600 series number and so sends a query to STP with attribute information specified in the call and the virtual phone number (6006667777).
426	STP 112 sends the query to SCP 110.	
427	SCP 110 uses the passed information to query database 108 for stored records and retrieves associated phone number. The phone number is then passed back in a response to STP 112.	SCP uses the passed attribute information to look for a record that matches. By looking for records belonging to the specified group phone number (6006667777), the search is restricted to members within the group. Further the port name, password information in the message is validated against the database to validated against the database to validate the sender. It retrieves Tom's phone number since his attribute matches the one specified in the query. (ATTRIBUTE_NAME=OCCUPATION, VALUE=real estate agent) SCP returns Tom's number to STP.
428	STP 112 sends response back to switch 104.	
429	Switch 104 completes call with other phone.	Switch S knows Tom's phone number is handled by it and so completes the connection with Tom's phone.

Table 10

[0084] Unrestricted registration

[0085] As mentioned above, another type of group enabled system includes the unrestricted

registration groups. According to this embodiment, it is possible to create groups with no

administration control over registration. This may be useful in some cases, where a spontaneous

group formation may occur. For example, people caught in a traffic jam can form a group and

coordinate among themselves. Someone asks for group creation by the mobile network and then

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others joining the group--the mobile network facilitates the group creation. A suitable convention such as using <location of traffic jam> _traffic_jam can be used so that people know the group name.

ILLUSTRATIVE EMBODIMENT BASED ON VISUAL IDENTIFICATION

[0086] In many situations we identify the person we need to speak with through visual sight: i.e. with our eyes. However, there is no way to use that identification as the basis of communicating with them electronically. Accordingly, another aspect of the present invention includes an embodiment of a system that enables communications based on visual identification.

[0087] According to this embodiment, a communication group is created as described above. For visual identification, attributes that can be identified visually are used (e.g., hair color, height, other physical body features, photograph, and the like). A Caller can specify attribute(s) that will be matched with the attributes registered in the group. If more than one match occurs caller can use other registered attributes to narrow down choice to intended recipient. Other algorithms like round-robin can also be used to reach the intended recipient. (round-robin calling would mean calling each of the people with matching registrations one by one till the correct person is reached).

[0088] We can also create an attribute that will be unique in a group. One way of creating such an attribute is to provide an identification badge to each person in the group. The badge and the identification name printed on it are available in the visible domain. The identification name on the badge can be used as a unique attribute in the electronic communication domain. When a person is identified visually, the identification name on the badge can be used to make an attribute call to the person.

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[0089] Illustrative scenario using mobile phones

[0090] In this system an identification badge is created to provide the link between the visual and electronic communication domains. Since the group administrator creates the badges, the badges can be maintained unique within the group. The identification badge is meant to establish identity only for the purpose of communication within the group. Thus it may have no relationship to the real identity of the person. As long as the person remains a member of the group she retains the identity and the ability to communicate. This temporary identity can be discarded at any time and there is no loss of privacy.

[0091] Now referring to Fig. 5, a visual identification call system 500 according to this embodiment is shown. For description purposes, a sample scenario will be referred to in which George calls Maria. The system 500 includes network components as described with respect to Figs. 1, 2, and 4. Like elements are reference with like numbers.

[0092] The message types, layouts, and corresponding database tables are similar to those described with respect to the Group enabled embodiments.

SYSTEM OPERATION

[0093] For description purposes, a set of sample phone numbers are used to describe the operation of the system according to one embodiment of the present invention. As a general matter, the area code "600" used in connection with this description is intended to represent a conventional virtual number prefix, e.g., 800, 877, or the like. Elements of the system 500 are associated with phone numbers as follows:

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Group Name		Energy_Seminar
Group administrator phone number		625-789-1234
Group phone number		600-565-6556
Registration center number		600-444-6666
Maria's phone number		713-234-8888

[0094] Table 11 describes one embodiment of system 500 as shown in Fig. 5. For illustration. purposes, corresponding examples to each of the steps relate to a sample transaction. In this example, a hypothetical seminar on Energy conservation uses a visual identification based electronic communication system 500. "Mark" is designated the group administrator 502.

Step	Description	Example
510	Visual identification creation: Group management 502 creates identification badges for use by members of the group (102).	Mark creates identification badges for the participants; among these identities is "brett", "sue". These identifiers are temporary identities and are used for communication within the group.
511	Group creation: A group is created by assigning a virtual phone number to represent the group and designating a phone number as the group administrator 502 phone number. This information is provided to the Registration center 106.	A group called "Energy_Seminar" is created with Mark being selected as the group administrator. The following information is provided to the Registration center: Group name: Energy_Seminar Group administrator phone number: 6257891234 Group phone number: 6005656556
512	Group creation information is stored in a database 108. The database is accessible to the SCP 110.	At the Registration center the information is stored in the group_definition table.
513	Port creation: Group administrator 502 sends "port_create" message to the registration phone number.	Mark sends a Port_create message to the registration phone number (600-444-6666). The message parameters are: GROUP_NAME=Energy_Seminar; PORT_NAME=temp; PASSWORD=2345 ADMIN_PHONE_NUMBER=6257891234;
514	Switch 104 routes call to Registration center 106.	
515	Registration center 106 validates call is from group administrator and then stores port information in database 108.	At the registration center the call originator is validated using the ADMIN_PHONE_NUMBER parameter and port name and password are recorded in the database. The Group_ports table is populated as follows: GROUP_PHONE_NUMBER=6005656556, PORT_NAME=temp,

		PASSWORD=2345
516	Port information is provided to new member 102b. (By some means not defined by this system--e.g. orally)	Maria enters the seminar hall and is provided with port name and password. In addition her visual identifier "sue" is provided to her.
517	Member 102b registers attributes through port.	Maria registers her visual identification attribute in the group by sending a Port_Attribute_register message to the registration phone number. (600-444-6666) The message parameters are: GROUP-NAME=Energy_Seminar; PORT_NAME=temp; PASSWORD=2345; MEMBER_PHONE_NUMBER=7132348888; VISUAL_IDENTIFICATION=sue; She then displays her visual identifier by wearing her identification badge.
518	Switch 104 routes call to Registration center 106.	
519	Registration center 106 stores details in a database 108.	At the registration center the group, port, password is validated and then Maria's attributes are recorded in the SCP database. The Port_attributes table is populated with attribute and phone number information.
520	Port creation for caller 102a: Group administrator 502 sends "port_creation" message to the registration phone number.	George enters the seminar hall. Mark needs to create a port for him. Mark sends a Port_create message to the registration phone number (600-444-6666). The message parameters are: GROUP_NAME=Energy_Seminar; PORT_NAME=temp1; PASSWORD=1122 ADMIN_PHONE_NUMBER=6257891234;
521	Switch 103 routes call to Registration center 106.	
522	Registration center 106 stores details in a database 108.	At the registration center the call originator is validated using the ADMIN_PHONE_NUMBER parameter and port name and password are recorded in the database. The Group_ports table is populated as follows: GROUP_PHONE_NUMBER=6005656556, PORT_NAME=temp1, PASSWORD=1122
523	Port info provided to caller 102a.	George is provided a port name and password. He is also provided his visual identifier "brett".
524	Attribute call Caller 102a sends a data packet specifying attributes and desired values to a	George decides that he needs some information from the person he can visually identify a "sue". He sends a Group_attribute_resolve message to

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	designated and virtual phone number.	the group phone number (6005656556). The message parameters are: GROUP_NAME=Energy_Seminar; PORT_NAME=temp1; PASSWORD=1122; VISUAL_IDENTIFIER=sue;
525	The switch 104 realizes it cannot complete the call and sends a query to STP 112.	Switch S realizes it cannot complete a 600 series number and so sends a query to STP with attribute information specified in the call and the virtual phone number (6005656556).
526	STP 112 sends the query to SCP 110.	
527	SCP 110 uses the passed information to query database 108 for stored records and retrieves associated phone number. The phone number is then passed back in a response to STP 112.	SCP uses the passed attribute information to look for a record that matches. By looking for records belonging to the specified group phone number (6005656556), the search is restricted to members within the group. Further the port name, password information in the message is validated against the database to validate the sender. It retrieves Maria's phone number since her attribute matches the one specified in the query. (ATTRIBUTE_NAME=VISUAL_IDENTIFIER, VALUE=sue) SCP returns Maria's number to STP.
528	STP 112 sends response back to switch 104.	
529	Switch 104 now completes call with other phone.	Switch S knows Maria's phone number is handled by it and so completes the connection with Maria's phone.

Table 11

[0095] The implementation of these techniques as well as similar adaptations falls within the scope of this invention.

[0096] While particular embodiments and applications of the present invention have been illustrated and described herein, it is to be understood that the invention is not limited to the precise construction and components disclosed herein and that various modifications, changes, and variations may be made in the arrangement, operation, and details of the methods and apparatuses of the present invention without departing from the spirit and scope of the invention as it is defined in the appended claims.

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